Prevalence of eating disorders in males: a review of rates reported in academic research and UK mass media

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ABSTRACT

Media presentations of health issues affect evaluations of personal susceptibility to particular illnesses and hence help-seeking behaviours. We examined data on prevalence of eating disorders (EDs – which are often characterised as 'female') among males in: scientific literature; readily-accessible web-based information; and UK newspaper articles (published 7/12/2002-7/12/2012). This revealed conflicting statistics. Academic papers suggest men comprise around 25% of community-based samples, but much lower proportions (10% or less) of clinic samples. Websites and newspapers present widely differing statistics both on prevalence overall (numbers with EDs in the UK ranged from 60,000 to 2.7 million), and in men (generally suggesting they constituted 10-25% of those with EDs), rarely distinguishing between diagnosed and non-diagnosed samples. By 2011, newspapers were more consistent on overall numbers with EDs in the UK (1.6 million) and the proportion who were men (20%), drawing on one website as the authoritative source. Conflicting statistics may confuse men searching for ED (or other) health-related information, lead to underestimations of male susceptibility to EDs and/or reinforce inappropriate stereotypes of EDs as confined to adolescent girls.

Key words:

- Eating disorders
- Males
- Gender differences
- Prevalence
- Media
- Newspapers
- Websites

INTRODUCTION

EDs are a common form of mental ill-health and were named a clinical priority area for Youth Mental Health in 2013-2016 by the UK Royal College of General Practitioners (RCGP - (Royal College of General Practitioners, 2013). However, EDs in males have been described as "underdiagnosed, undertreated and misunderstood" (Strother, Lemberg, Stanford, & Turbeville, 2012), p346, and their skewed gender distribution has often led to their construction as women's issues (Bramon-Bosch, Troop, & Treasure, 2000; Till, 2011; Wooldridge & Lyttle, 2012). Young men with EDs have described how these feminised cultural constructions of EDs predisposed them (and people around them - families, peers, health and education professionals) to overlook symptoms. The possibility that they may have an ED often simply did not occur to anyone until their symptoms had become entrenched (Räisänen & Hunt, 2014). This delay in recognising symptoms in men potentially has very serious consequences, as early ED diagnosis and treatment is crucial in the prevention of long term, potentially life-threatening, psychiatric morbidity (Räisänen & Hunt, 2014; Stanford & Lemberg, 2012). The first step in a process of timely help-seeking is for people with EDs to recognise their symptoms at an early stage, and respond to them as a potential sign of illness by evaluating their experiences in the light of accumulated "stock(s) of knowledge" and interactions with others (Wyke, Adamson, Dixon, & Hunt, 2013) p80. This paper takes one approach to questioning how these "stocks of knowledge" may be created at a cultural level. It examines how the prevalence of eating disorders (EDs) both overall, but particularly among men (compared to women) is presented in the media, and attempts to link the figures cited therein to research evidence.

The mass media are an important source of health knowledge (Hilton & Hunt, 2011; Lyons & Willott, 1999; Seale, 2002). Despite declining circulations, newspapers (including online versions) remain a significant public information source, although the volume and quality of reporting of health-related research in UK newspapers varies (Robinson, Coutinho, Bryden, & McKee, 2013). Paralleling declines in print newspapers, internet use has increased and now reaches most of the UK population, with around three-quarters of adult users ever having looked for online information about health and medical care (Dutton, Blank, & Groselj, 2013). High levels of ED-associated shame and secrecy might increase the likelihood that ED sufferers could seek information online (Murphy, Frost, Webster, & Schmidt, 2004).

However, media presentations are filtered and constructed in ways which impact on both knowledge and understanding. Stories can be given more or less prominence and framed in different ways, thus influencing how audiences make sense of the issues in question (Taylor & Sorenson, 2002). This is evident in the three studies of which we are aware relating to presentation of EDs in newspapers. A study of ED-related Italian newspaper articles published in 1985-95 concluded that descriptions of clinical symptoms largely corresponded with scientific literature, but the nature of articles changed over this period from describing isolated cases, to clinical descriptions and finally sensationalist articles about rising rates of anorexia (Mondini, Favaro, & Santonastaso, 1996). An analysis of the presentation of EDs in US daily papers over one year (1994-5) reported they were constructed as a (young) "female issue" and "a source of titillation" rather than as deserving serious consideration (O'Hara & Smith, 2007) p47-48). Finally, an examination of UK newspaper articles on EDs published over the same period suggested these included more medical information and less optimism about recovery than US publications (Shepherd & Seale, 2010). We are not aware of studies focusing particularly on presentation of ED *prevalence* in the media. However prevalence is an important component of the health knowledge used by individuals to evaluate, label and explain symptoms and changes in themselves and others (Wyke et al., 2013).

This paper emerged while examining the portrayal of EDs among males within UK newspapers in order to understand one source of the cultural construction of the illness as "female". We were struck by the contradictory information presented on ED prevalence in the various articles, including variations by gender over time, and so began to examine the academic literature in this area. This started with a number of reviews relating to EDs among males (Carlat & Camargo, 1991; Crosscope-Happel, Hutchins, Getz, & Hayes, 2000; Hoek & van Hoeken, 2003; Muise, Stein, & Arbess, 2003; Strother et al., 2012; Weltzin et al., 2005; Wooldridge & Lyttle, 2012) and moved to primary studies of prevalence and incidence. We also noted reference to web-based material within the newspaper articles. Our paper therefore presents and compares information relating to ED prevalence available from both academic research and two publically-available sources (websites related to EDs and articles published in UK newsprint media between 2002 and 2012). While recognising academic literature (e.g. (Rosen, 2010)) and media portrayals relating to EDs in children, we focus, where possible on older adolescents (around age 14-15 upwards) and adults in order to manage the scope of the paper. Evidence suggests that in males, mean age of AN onset is around 15-19 years, with BN onset around 19-29 years, however EDNOS diagnoses and ED preoccupation may peak earlier (10-14 years - (Micali, Hagberg, Petersen, & Treasure, 2013; Muise et al., 2003; Norris et al., 2012).

The paper aims to contribute to understandings of EDs in three ways. Firstly, it adds to existing academic literature on ED rates, both in males and overall. Secondly, it examines how epidemiological and clinical findings on ED prevalence or incidence, both in men in particular and overall, have been presented in the media. Thirdly, it compares how a particular example of health-related information (ED prevalence rates) is presented in academic research and in publically-available sources, and so serves as a case study illustrating communication of scientific knowledge through the media to the lay public and clinicians, and an example of how this can be linked to the gendering of illness.

METHODS

This section details and defines the EDs considered in this paper, and how we identified relevant academic literature, publically available web-based information on ED rates and newsprint articles on EDs in men.

Defining eating disorders

In this paper we consider statistics, and related text referring to: any ED; the specific diagnoses of Anorexia Nervosa (AN), Bulimia Nervosa (BN), Binge-Eating Disorder (BED) and Eating Disorders Not Otherwise Specified (EDNOS); and single ED symptoms. Between 1994-2013 (i.e. when most of the material on which we draw was published), EDs were categorised within the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-IV - (American Psychiatric Association, 1994) in terms of two specific diagnoses, AN and BN, together with an additional EDNOS category. DSM-V (American Psychiatric Association, 2013), released in 2013, acknowledged BED as a separate diagnosis and removed the EDNOS category. Essential features of AN include refusal to maintain a minimally normal body weight, intense fear of weight gain, significantly disturbed body size perception and amenorrhoea in post-menarcheal females. BN is characterised by binge eating and inappropriate compensatory behaviours to prevent weight gain occurring at least twice weekly for three months. If all DSM diagnostic criteria are met this is described as AN/BN "full syndrome"; if only some are met, this is "partial syndrome" (Cotrufo, Barretta, Monteleone, & Maj, 1998). BED is defined as recurrent binge eating without inappropriate compensatory behaviours, occurring at least weekly for three months. EDNOS included EDs not meeting the criteria for either AN or BN.

Identification and presentation of academic literature

As noted above, our interest in the academic literature was initially sparked by contradictory information presented on ED prevalence in the newspaper articles. We therefore sought literature to provide context. At its simplest, we wanted to understand why media presentations of ED prevalences varied by several orders of magnitude, and whether this variation was paralleled in the academic literature. Our interest in media presentations meant that also including a full systematic review was outwith the scope of this paper, so academic papers were identified by searching a broad scientific citation index (Web Of Knowledge) using search terms relating to both EDs ("eating disorder*"; "anorexi*"; "bulimi*") and males ("male*"; "men"; "man"), and subsequent identification of relevant primary sources from the reference lists of key papers. No date limits were set on the search, however the majority of identified studies were published since 2000, a period which has been identified as one of increasing research and clinical interest in males with EDs (Cohn, 2012). The search strategy thus followed a standard approach for a narrative literature review introducing an empirical scientific paper, and not the exhaustive approach required for a systemic review; nonetheless we used a systematic and transparent approach as described here. We have included the most frequently cited epidemiological studies of EDs which present and/or compare rates for older adolescent or adult males and females (for any ED, AN, BN, BED, EDNOS and ED symptoms) in studies of both community-based samples (reported in Table 1) and diagnosed or clinic-based samples (reported in Table 2). These tables note brief study details together with percentages with ED diagnoses/symptoms (in the sample overall, in males and in females) and the percentage with ED diagnoses/symptoms who were males.

Identification of publically available web-based information on ED rates

We examined readily identifiable (e.g. via google)[a] and/or widely cited web-based sources of information on prevalence of EDs in men, or by gender.

These sources included three prominent reports. The first was a review of ED services for men prepared in 2000 for the UK Eating Disorders Association (EDA, now named b-eat - (Copperman, 2000)[b]. Although this report does not feature prominently in internet searches conducted at the time of writing (Summer 2014), its content is widely referred to in academic literature and newspapers, suggesting a prominent web presence closer to publication. The two other reports were the UK National Institute for Health and Clinical (now Care) Excellence (NICE) guidelines on treatment of EDs, published in 2004 (National Institute for Clinical Excellence (NICE), 2004)[c]; and a 2012 UK Royal College of Psychiatrists (RCPsych) report on ED services (Royal College of Psychiatrists' Section of Eating Disorders, 2012)[d]. We also identified two UK

RCPsych leaflets: "Key Facts: Eating Disorders" dated 2012[e], described as an abridged version of "Anorexia and Bulimia", dated 2013[f]. We accessed the ED sections of two more general UK health websites (the UK Mental Health Foundation[g] and the NHS Your Health Your Choices[h]) and four sites specifically focusing on EDs. These were: (1) the National Centre for Eating Disorders website[i]; (2) Disordered Eating: Information About Eating Disorders[j]; (3) the Beat Eating Disorders (b-eat) website which provides a range of information links and leaflets, some particularly for men[k] together with "Media Centre" pages with downloadable ED reporting guidelines[l]; and (4) a site specifically for men with EDs run by a UK charity Men Get Eating Disorders Too[m]. Finally, we examined the Wikipedia eating disorders entry[n]. All websites were accessed Spring-Summer 2014. In the sections which follow, the absence of reference to any of these 13 websites indicates that no relevant information could be found within it.

Identification of newsprint articles on EDs in men

Ten UK National newspapers were selected for study, based on high circulation figures and readership profiles as identified by the UK National Readership Survey (www.nrs.co.uk), following the methods of other analyses based on newspaper samples with various readership demographics and political orientations (Hilton, Hunt, Langan, & Petticrew, 2010; Williams, Seale, Boden, Lowe, & Steinberg, 2008). Our sample consisted of: three "serious" newspapers and Sunday/online counterparts *(The Guardian [TG], Guardian Unlimited [GU]* and *The Observer [TO]; The Independent [TI], Independent on Sunday [IOS]* and *independent.co.uk [IO]; The Daily Telegraph [DT], Sunday Telegraph [ST]* and *telegraph.co.uk [DTO]);* two "middle-market tabloid" newspapers *(The Daily Mail [DMa], Mail on Sunday [MOS] and Mail Online [MO]; The Express [TE]* and *Sunday Express [SE]);* and five "tabloid" papers *(The Sun [TS]; News of the World [NW]; Daily Star [DS]; The People [TP];* and *Daily Mirror [DMi]* and *Sunday Mirror [SM]).* Relevant articles were identified via two electronic databases (Lexis Nexis, and Newsbank), using search terms relating to EDs ("eating disorder", "eating issue", "eating problem", "anorex*", "bulim*", "manorex*", "bigorex*", "orthorex*", "binge eat*", "compulsive over eat*", "eating disorder not otherwise specified", "EDNOS", "over eating disorder", "disordered eat*", "b-eat"), and search terms relating to males and males ("male", "m*n", "boy", "lad", "bloke", "guy"). Wild cards were included to capture variants such as anorexic/anorexia, eat/eater/eating and man/men. We selected a 10-year time frame (7/12/2002-7/12/2012) for substantive and practical reasons. First, this period represented a time of increasing interest in males with EDs, both clinically and in respect of research (Cohn, 2012); very few relevant studies were conducted prior to 2000. Secondly, ten years yielded a substantial but manageable number of newspaper articles and allowed for examination of time-trends.

The initial search retrieved 480 articles. Articles were excluded if they: (1) contained no text acknowledging males can suffer from EDs: (2) only used an ED term as an adjective or metaphor (e.g. “slim to anorexic chance of winning”); (3) profiled a male celebrity who had an ED, but in which this was only tangentially mentioned; (4) were short lead-ins referring to a main article in the same newspaper edition (main article hence included in the sample); (5) were letters, problem pages/advice, TV guides, or review pages; or (6) were duplicate articles. Decisions on search strategy and exclusion criteria were made following detailed discussion between all authors based on initial review of a random sample of potentially eligible articles. Database searches and final screening of articles for eligibility were conducted by LW.

Following de-duplication and assessment against exclusion criteria, 138 articles were identified for detailed textual analysis. All articles were read multiple authors to generate broad thematic categories and a coding framework which was applied (by LW) using NVivo 10 qualitative data software. One of these thematic categories was “prevalence of EDs”; 78 of the 138 articles included text relating to prevalence. More detailed interpretive analysis of this “prevalence” category in these articles was then conducted independently by HS and KH. For the purposes of the analysis presented here, articles referring exclusively to prevalence of EDs in children (pre-teens) were also excluded, reducing the number to 58. Within these, 27 used numbers and/or words to refer to overall ED prevalences in older adolescents and adults, 50 to prevalences in males and 49 to gender differences in prevalences.

The newspapers from which the articles included in this analysis were drawn were fairly evenly divided between “serious”, “middle market tabloid” and “tabloid” publications. Around a third of the articles were news pieces, the remainder being features or commentaries, often featuring accounts from or about men with EDs. Three articles referred to an academic study (only one of which was about males) including comments from the author(s), while a further two mentioned ‘Harvard research’ (most likely (Hudson, Hiripi, Pope, & Kessler, 2007). Around half the remainder provided “estimates” or “figures” from ED charity or treatment centre spokespeople or “experts”, or from UK bodies such as NICE, the Royal College of General Practitioners or RCPsych, with the other half providing no source for any figures given.

RESULTS

Because most websites and many of the newspaper articles presented statistics relating to EDs within the population *overall* (i.e. males plus females), we first compare how these are presented in the academic sources, websites and newspaper articles. We then examine the academic sources, websites and articles in respect of gender differences in ED rates, gender differences in ED rates in community versus diagnosed or clinic-based samples ("hidden" male EDs) and trends in rates of EDs in men.

Overall rates or numbers of EDs in community samples

Table 1 summarises publication date, country of origin, sample, data collection procedures and measures of epidemiological studies of ED rates in community samples. The table shows percentages with ED diagnoses/symptoms (in the sample overall, in males and in females) and the percentage with ED diagnoses/symptoms who were males. Section 1a of the table shows two studies reporting ***lifetime prevalences of any ED***. An overall rate of 3.4% in people aged 15 and over was reported in a Canadian epidemiologic survey (Woodside et al., 2001), but a much higher rate of 12.2% in a Norwegian study of 14-15 year olds (Kjelsas, Bjornstrom, & Gotestam, 2004). The next section (1b) shows several studies reporting ***current or past year prevalence of any ED***, ranging from 3.2% among Australian general practice attendees (Hay, Loukas, & Philpott, 2005) to 6.4% in a UK adult population sample (Thompson, Brugha, & Palmer, 2009). In addition, 9.5% of those responding to a self-completion questionnaire in a US psychology publication reported they thought they had an untreated ED (Garner, 1997).

Rates of AN and BN are much lower. Table 1, section 2a shows several studies all suggest ***lifetime prevalences of AN "full syndrome"*** of around 0.5%, while ***lifetime prevalences of BN "full syndrome"*** (Table 1, section 3a) range from 0.6-1.0%. ***Lifetime prevalences of BED*** (Table 1, section 4a) are somewhat higher (1.2%-2.8%), but based on few studies. Finally, rates of ***EDNOS*** (Table 1, section 5a) and, as would be expected, of ***ED symptoms*** (Table 1, section 6a) are much higher. For example, three different studies of US adults reported current or past year binge eating rates of 2.1% (Hudson et al., 2007), 6.0% (Keel, Baxter, Heatherton, & Joiner, 2007) and 9.0% (Striegel-Moore et al., 2009).

The context provided by such results is one of conflicting prevalence figures, with, for example, past year ED rates in some studies higher than lifetime ED rates in others. Against this background, presentation of

figures for overall rates of EDs in the web-based information we analysed varied in respect of clarity of source, type of ED and whether presented as rates or total estimated numbers in the population. However, figures ranged from suggesting that EDs affected as little as 0.1% of the population to over 10%.

This, a review of ED services for men, prepared in 2000 for the *UK EDA*, provided a figure of 60,000 as the point prevalence for AN plus BN within the UK, citing a 1992 RCPsych report on ED services (Copperman, 2000). (Based on a UK population of around 60 million[o], the figure of 60,000 would represent a prevalence of 0.1%). UK *NICE guidelines on treatment of EDs*, published in 2004, included higher estimated prevalence rates of 0.5-1.0% for AN and 1.0-3.0% for BN (National Institute for Clinical Excellence (NICE), 2004). (Based on a UK population of around 60 million, this would be approximately 0.3-0.6 million people with AN and 0.6-1.8 million with BN, averaging to around 0.4 million with AN and 1.2 million with BN, so totalling around 1.6 million). The most recent (2012) *UK RCPsych report on ED services* (Royal College of Psychiatrists' Section of Eating Disorders, 2012) cited lifetime population prevalence rates based on just a very few studies; 0.9-4.3% for AN, based on studies of a US population survey (Hudson et al., 2007) - Table 1, section 2a) and an Australian twin cohort (Wade, Bergin, Tiggemann, Bulik, & Fairburn, 2006), and 4-7% for BN, based on a population sample of young Italian women (Favaro, Ferrara, & Santonastaso, 2003). In May 2014, the UK *Mental Health Foundation* website stated that AN and BN "affect about 2% of adult females and some men". The NHS *Your Choice Your Health* website provided lifetime prevalence figures of "around 1 in 250 women and 1 in 2,000 men" for AN and suggested BN "is around five times more common than anorexia nervosa" while also noting that "due to the difficulty of precisely defining binge eating, it is not clear how widespread the condition is". A leaflet available via the *b-eat* website ("Information leaflet about Beat") included the statement that "Over 1.6 million men and women of all ages and backgrounds in the UK are affected by eating disorders". The *b-eat "Media Centre"* section also included the 1.6 million figure (attributed to NICE), as well as the figure of up to 6.4% of adults reporting signs of an eating disorder, as reported in a UK study (Thompson et al., 2009) – see above and Table 1, section 1b). (6.4% of a population of approximately 60 million would mean 3.8 million people with signs of an ED in the UK.) The *Men Get Eating Disorders Too* website (which provides links to b-eat) also included the figures of 1.6 million affected by EDs and "an alarming 6.4 per cent of adults" having a problem with food. However, *Wikipedia* provided far higher figures, stating that EDs affect "an estimated 5–10 million" UK females and "an estimated 1 million UK males". If true, this would be around 17%-33% of the UK female population, and 3% of the male population. Most web-based information (the 2000 *EDA review* of ED services for men and 2004 *NICE guidelines* on ED treatment, and the *Disordered Eating*, *National Centre for Eating Disorders*, *b-eat*, *Men Get*

Eating Disorders Too and *Wikipedia* websites) touched on issues of definition, small samples, conflicting and/or poor quality data, but none specifically related these to confusion over prevalence or incidence figures.

Within the 2002-12 newspaper sample, estimated numbers or rates of EDs also varied widely, from 0.1 to 4.5% of the population (60,000 to 2.7 million). Examination based on date of publication shows first mention of an overall number of ED sufferers in the UK in the newspaper articles occurred in the *Sunday Mirror* in September 2003, "according to the Eating Disorders Association, an estimated 1.1 million people in Britain have an eating problem. Of those, 400,000 suffer from anorexia nervosa" *(SM-14/09/2003)*. However, six months later, the *Sunday Express* reported a lower number, "The British Medical Association estimates that ... 60,000 people [are] suffering at any one time from an eating disorder ..." *(SE-28/03/04)*, and four months after that, the *Guardian* provided a far higher number: "Around 2m people in the UK are estimated to have anorexia or bulimia nervosa" *(TG-13/07/2004)*. A 2005 article noted there are "around 1.5 million women, men and children with eating disorders in the UK" *(TE-08/02/05)*. In April 2006, the *Daily Mail* stated that 1.1 million people have a diagnosed ED *(DMa-01/04/06)*, and in April 2008, two articles noted EDs "affect more than a million" *(DMa-21/04/08)* and "Experts believe there are more than a million people in Britain with disorders like bulimia or anorexia" *(DMi-21/04/08)*. A number of articles around 2009-11 quoted figures of 2.7 million, attributed to the NHS Information Centre, with one contrasting this to the previous 1.1 million figure. However, after 2011, the only figure mentioned in the newspaper articles was 1.6 million, with several attributing this to information from the eating disorder charity, b-eat.

Gender differences in ED rates in community samples

As Table 1, sections 1a and 1b show, studies within community samples are fairly consistent in suggesting males constitute around 25% of those with both ***lifetime*** and ***current or past year prevalence of any ED***. Focusing on four surveys of ***lifetime prevalence of "full syndrome" AN***, Table 1, section 2a shows the proportion of males ranged from 11.8%-25.0%. As a number of authors point out (Hay et al., 2005; Muise et al., 2003; Striegel-Moore et al., 2009) and as Table 1 also shows, male rates tend to increase relative to those of females if "partial", rather than "full" diagnostic criteria are used. Thus in one study, the proportion of males was 19.5% when AN was defined via "full" criteria, but 39.8% when defined via "partial" criteria (Woodside et al., 2001). Male-female ratios in respect of ***lifetime prevalence of "full syndrome" BN*** (Table 1, section 3a), range from 8.2%-25%. Again, the proportion of males is higher when weaker

criteria are applied; males constituted 8.2% of Canadian adults with lifetime BM "full" syndrome, but 35.8% of those with lifetime BN "partial" syndrome (Woodside et al., 2001) - see section 3b). The proportion of males is also higher in respect of ***BED*** (Table 1, section 4) and ***EDNOS*** (section 5). However, the highest proportion of males occurs in respect of ***ED symptoms*** (Table 1, section 6). For example, males constitute around two-thirds of adults reporting severe bingeing twice weekly (Westenhoefer, 2001) and both lifetime and 12-month sub-threshold BED (Hudson et al., 2007).

Most of the publically available web-based information examined was consistent in suggesting males constitute around 10% of those with EDs, considerably less than the 25% figure suggested by the literature. However both lower and higher (up to 25%) figures could also be found and, in two cases, no figures were given; *the Mental Health Foundation* and *Disordered Eating* websites simply stated that EDs are "more common in women". The 10% figure or equivalent (i.e. 90% of those diagnosed are women; girls and women are ten times more likely to suffer ...; disorder affects around 1/N women and 1/10N men) could be found in the 2000 *UK EDA review* (Copperman, 2000), the 2004 *NICE guidelines on treatment of EDs* (National Institute for Clinical Excellence (NICE), 2004), the 2012 *RCPsych report on ED services (Royal College of Psychiatrists' Section of Eating Disorders, 2012)*, the 2012-13 *RCPsych leaflets* "Key Facts: Eating Disorders" and "Anorexia and Bulimia", the *National Centre for Eating Disorders* website and *Wikipedia*. The *NHS Health Choices "Eating disorders"* website also provided the 10% figure in respect of AN and BN, but stated "Binge eating usually affects males and females equally". The *b-eat* "eating disorders and men" website section distinguished between diagnosed and undiagnosed EDs, stating "at least 10% of people *diagnosed* as having an eating disorder are men", but also noting the probability that males constitute a higher proportion of undiagnosed cases. The *b-eat "Media Centre"* suggested "15-20% of cases are boys and men". However its "facts and figures" section also referred to findings from a UK study (Thompson et al., 2009) - Table 1, section 1b) "that a quarter of those showing signs of an eating disorder were male, a figure much higher than previous studies had suggested". Finally, the *Men Get Eating Disorders Too* website included both the 10% and 25% figures: "between 10 and 25 per cent of those people experiencing eating disorders are male".

Unsurprisingly, given their focus, most of the newspaper article sample made some reference to ED rates in males compared with females. With very few exceptions, the figures provided were 10%, 20%, 25% or their equivalents ("one-in-ten/five/four"). The exceptions ranged from very low figures ("some statistics suggest that 2-8% of all [BN] cases in the US are now male" *TG-22/08/07*) to very high ones ("with experts

suggesting that 40% of binge eaters ... are male" *TO-16/05/10*). Occasionally, more computation is needed; for example, the *Observer* reported RCPsych estimates "that one in every 1,000 young men and seven in 1,000 young women have an eating disorder" *(TO-16/05/10)*. Finally, a very small number provided statements suggesting confusion on the part of the journalist; for example "only about 10% of men suffer anorexia and bulimia" *(DMi-20/09/12)* may have been intended as "only about 10% of anorexia and bulimia sufferers are men".

Examination of the newspaper sample by publication date shows the earliest estimate, in 2003, suggested males account for 10% of all those with EDs. The 10% figure continued to appear, but less consistently, and was last mentioned in 2011 ("around 240,000 British women and 30,000 men have the disorder [AN]" *DS-06/04/11*). The first mention that the 10% figure could be too low occurred in 2004, when a number of articles quoted the EDA as "believing" or "estimating" that around 20% of those with EDs are men. The 20% figure was also referred to in a series of articles in 2007 relating to AN. References to 10% as "too low" continued throughout the period of the newspaper sample. However around 2008-10 the 20% figure was replaced by 25% in almost every article. For example "a quarter of those with eating disorders are men, figures have revealed" *(DMa-28/01/2009)*. Interestingly, the 20% figure re-emerged in 2011: "An estimated 1.6 million people in the UK suffer from an eating disorder, and around one in five is male, according to the eating disorders charity B-eat" *(IO-19/07/11)*. Eight of the 11 articles published in 2012 which made some reference to prevalence referred to the 20% figure.

Gender differences in ED rates in community versus diagnosed or clinic-based samples ("hidden" male EDs)

Table 2 summarises epidemiological studies which include and/or compare ED rates for males and females among diagnosed or clinic-based samples. Some report percentages of males and/or females within their sample, others report numbers or incidence rates. As with Table 1, the right-hand column shows the percent of male cases within the overall sample.

Table 2 (section 1) shows that in five studies focusing on ***EDs overall***, males constituted 5%-11% of UK and US adult patient samples. Generally similar proportions of males were also found within most ***AN*** diagnosed or clinic-based samples (Table 2, section 2); AN clinic or diagnosed samples with very low (1.7% - (van Son, van Hoeken, Bartelds, van Furth, & Hoek, 2006) or very high (27% - (Jones, Fox, Babigan, &

Hutton, 1980) proportions of males were based on small numbers. Studies of ***BN*** clinic incidence rates, diagnoses and treatment insurance claims (Table 2, section 3) all found males to constitute 5% or less of their samples. Males also constituted around 5% of samples of UK adult patients diagnosed with ***EDNOS*** (section 4) (Button, Aldridge, & Palmer, 2008) (Micali et al., 2013), but 19% of a US study of those treated for EDNOS (Striegel-Moore, Leslie, Petrill, Garvin, & Rosenheck, 2000). Thus, with only a few exceptions, males appear to comprise around 5-10% of those treated for EDs overall and for AN, and around 5% of those treated for BN. The smaller proportion of males generally identified in clinic-based compared with community-based samples points to a "community reservoir of undiagnosed men" (Kjelsas et al., 2004), p.20).

Under-diagnosis of EDs in men, highlighted in the literature, was also noted in several of the publicly available documents or websites. The 2000 UK *EDA review* highlighted differences between numbers of men with EDs in the community and known to clinics (Copperman, 2000), while both the 2004 *NICE guidelines* (National Institute for Clinical Excellence (NICE), 2004) and *Wikipedia* noted poor detection of EDs in males. The *National Centre for Eating Disorders* site suggested it is "very hard for men to seek help" for EDs, while the *Men Get Eating Disorders Too* site noted "the majority of men who have eating disorders struggle to get access to appropriate support and treatment". On the *b-eat* website, the "eating disorders and men" section stated "... there are probably many more undiagnosed cases because there is less chance of the condition being recognised in male sufferers".

Within the newspaper sample, lack of attention and failure to diagnose men with EDs is also noted, with first reference occurring in 2004, when one article noted that while EDs are most commonly associated with younger women, older women and men have "the same problems but without the attention" *(TO-01/02/04)*. Later articles reported "experts" describing figures relating to EDs in men using terms such as "just the tip of the iceberg", "hidden", "secret", "endured in silence" and "unreported", and suggested the "actual" figures are, or could be, much higher. In particular, articles written immediately following, or shortly after news in 2008 that a UK politician, John Prescott, had suffered from BN, included the idea that the condition may be widespread but concealed among large numbers of middle-aged men. Similar articles commented that his disclosure (after which "calls from men to eating disorder help-lines increased tenfold" *MOS-03/08/08*) would "encourage more men to seek help for 'women's problems'" *(TS-24/04/08)*.

Trends in rates of EDs in males

Within the academic literature, several authors note increasing preoccupation with body image among males since the last quarter of the Twentieth century (Garner, 1997), but Tables 1 and 2 do not show clear trends towards decreasing M:F ratios for EDs over this period, and studies specifically addressing the issue of changes in ED rates have had inconsistent results. Thus, in the USA, studies have variously found *no change* in rates of EDs in males between 1935-84 (Lucas, Beard, O'Fallon, & Kurland, 1991), *reductions* in male AN diagnoses between 1960-69 and 1970-79 (Jones et al., 1980) and *increasing* male ED hospital admissions between 1984-97 (Braun, Sunday, Huang, & Halmi, 1999). Although three studies of ED trends within UK primary care have been conducted, those examining rates between 1988-93 (Turnbull, Ward, Treasure, Jick, & Derby, 1996).and between 1994-2000 (Currin, Schmidt, Treasure, & Jick, 2005) were restricted to 10-39 year old females, since there were very few cases outside this gender- and age-group. The third, examining rates between 2000-2009, found stable incidence of AN and BN but increasing EDNOS incidence in both men and women (Micali et al., 2013). Another UK study found stable gender differences in new patients assessed by a specialised adult ED service 1987-2007 (Button et al., 2008). In contrast, a Dutch primary care study found stable AN incidence but decreasing BN incidence between 1985-89 and 1995-99, however these results were based on extremely small numbers (van Son et al., 2006).

These inconsistent findings are reflected in the web-based material which also provided a range of data, suggesting variously that EDs had not increased among either men or women, may have increased (in all/men) or had definitely increased in men. Among those suggesting no increases, *b-eat's* "Eating disorders and men" factsheet countered a statement suggesting that EDs did not exist in the past with "Actually research suggests that eating disorders have always been with us in one form or another", while the 2012 *RCPsych report* (Royal College of Psychiatrists' Section of Eating Disorders, 2012) stated "the overall incidence and prevalence of anorexia nervosa and bulimia nervosa is stabilising in Western countries", referencing studies (described above) based on primary care records conducted in the UK (Currin et al., 2005) and the Netherlands (van Son et al., 2006). The *b-eat "Media Centre" ED reporting guidelines* referred to increasing numbers of people seeking treatment (without mentioning gender differences). Among those suggesting increasing ED prevalence among men, the 2000 *UK EDA report* noted that although recent literature and anecdotal evidence suggested EDs were increasing in men, this was hard to substantiate (Copperman, 2000). Rather similarly, the 2013 *RCPsych "Anorexia and Bulimia" leaflet* noted EDs "seem to have become more common in boys and men", but also acknowledged "it may be that men are now seeking

help for eating disorders rather than keeping quiet about them". Finally, the wording on two sites suggested more definite increasing ED prevalence among men. Thus *Men Get Eating Disorders Too* provided a figure in respect of increases among males: "recent reports from the Royal College of Practitioners [presumably RCGP] has indicated a 66 per cent rise of male hospital admissions" and *Wikipedia* suggested "Eating disorder rates are not only increasing among females but also males are more concerned with their body image than ever before".

Only a few newspaper articles suggested EDs (general or specific) were rising *overall* within the UK, contrasting with the much larger number referring to increasing levels of EDs ("such as anorexia or bulimia") and/or specific EDs in *males*. This certainty is inconsistent with the academic literature reviewed here. A small number of articles *suggested* increasing EDs without describing specific disorders, e.g. men are "more weight obsessed" *(TO-03/08/08)*, "getting body hang-ups" *(DMi-23/09/08)* or repeating the "'size zero' trend" previously seen in females *(TO-16/05/10; TO-03/08/08)*. Only two contrasted this with female ED rates, each suggesting these had not changed significantly.

In respect of specific disorders, and in addition to AN, articles also described the emergence/increase of male-specific ED terms, including "manorexia" and disorders in which men (specifically) were described as desiring to become more muscular, namely "bigorexia" or "inverse"/"reverse" anorexia. A further new disorder highlighted by a very few articles was "orthorexia" (obsessive fixation with healthy and pure eating), described variously as affecting equal numbers of men and women *(TO-16/08/09)*, "becoming more prevalent in men" *(DT-12/08/09)*, and as affecting 10% women and 20% of men *(DMa-23/03/11)*.

Some articles also included figures, including comparisons with the commonly quoted, but now apparently outdated 10:90 ratio of male to female ED sufferers. Other figures quoted include "137 men suffering the most severe cases of anorexia saw specialists in the past year - up from 82 during 2001/02" *(MOS-03/08/08)*, "the number of men treated for anorexia - "manorexia" - has increased by 67 per cent in the past five years" *(TI-22/09/08)*, "manorexia toll trebles in 10 yrs" *(TS-10/04/12)* and RCGP reports of a 66% rise in English hospital admissions of men for eating disorders since 2001 *(IO-19/07/11; TE-16/08/11; MO-11/06/12)*, or other specific figures relating to increases in ED cases or admissions among men generally and/or young men specifically. However, most descriptions of increasing ED prevalence in men were text-based, using terms such as "increasing numbers", growing problem" or "more than ever". A small number used the term epidemic: "male anorexia has become an unrecognised spiralling epidemic" *(MOS-03/08/08)*;

"manorexia – the hidden epidemic" *(DMi-25/02/10)*.

Increasing male ED rates were almost exclusively presented as "real" in the newspaper articles, frequently followed by speculations relating to aetiology. The only two exceptions (both April 2012) quoted ED charity representatives as suggesting increasing rates may have resulted from greater awareness *(MO-16/04/12)* or recognition *(DMi-25/04/12)* of EDs in males, although the latter countered this with suggestions from another spokesperson that "there may indeed be a genuine increase in the numbers of men with eating disorders in the UK".

DISCUSSION

This paper aimed to add to existing academic literature (Carlat & Camargo, 1991; Crosscope-Happel et al., 2000; Hoek & van Hoeken, 2003; Muise et al., 2003; Strother et al., 2012; Weltzin et al., 2005; Wooldridge & Lyttle, 2012) on ED rates (overall and in males) and examine how these research findings have been presented in media outlets that are commonly utilised for health information: web-based information provided by "reputable" health-related organisations or charities and newspaper articles. It also aimed to highlight some of the challenges of communication of accurate scientific knowledge to the lay public and clinicians through the media, using ED prevalence rates as a case study.

Our narrative review of epidemiological and clinical research on ED rates highlighted several key points. First is the relative absence of large-scale studies. One frequently reported Canadian epidemiologic study found an overall adult lifetime prevalence of any ED of 3.4% (Woodside et al., 2001), roughly consistent with studies of specific diagnoses which have suggested overall lifetime prevalences of around 0.5% (AN), 0.6-1.0% (BN) and 1.5-3.0% (BED). A second key point is that while community-based studies suggest men constitute around 25% of those meeting "full" ED criteria, the proportion is higher if based on "partial" criteria. In contrast, the proportion of men within clinic-based (i.e. diagnosed) samples is 10% or less. Also important is that this research does not show clear time-trends in respect of the proportion of those with EDs who were men in either community- or clinic-based samples. Finally, the review underlined an important methodological issue with all studies of DSM-defined and/or diagnosed EDs, namely that with very low rates, particularly among men, small variations in numbers can dramatically alter conclusions

EDs provide an interesting basis for a case study of communication of scientific knowledge through the media and of the complexities of accurately conveying the prevalence of a health condition by gender, because the figures are complex and confusing, and vary depending on the definition adopted (any ED, specific diagnoses or ED symptoms), whether based on community or diagnosed/clinic samples, sample ages, and finally, whether referring to prevalence (point, past year or lifetime) or incidence rates. Against this background, it is perhaps not surprising that we found considerable variation in mass media reporting of rates, overall and for males in relation to females. This is best reflected in the range of statistics to be found in websites relating to EDs overall. These included percentages ranging from below 1% to over 5% for specific disorders, rates such as 1 in 250, and numbers including 60,000, over 1.6 million and 5–10 million. Some may be erroneous, others would be difficult for an individual looking at several websites to reconcile into a clear understanding. Most websites touched on methodological issues (e.g. ED definition employed, small samples), but no website or newspaper article related these to confusion over prevalence or incidence figures or unsubstantiated conclusions with regard to trends. For most of the 2002-12 period examined, newspaper statistics relating to numbers with EDs in the UK also varied widely (from 60,000 to 2.7 million) and were, on occasion, unclear over whether the figures quoted related to all EDs, or to specific disorders, particularly anorexia. However by 2011 all articles were consistent, in line with (and often referencing), the b-eat website. While only a small number of articles referred to specific studies and a significant minority provided no source for their statistics, others referred to information obtained from websites, some of which, in turn, referred to other websites or specific reports. Use by journalists of online sources has led to concerns about both lack of cross-checking or validation of sources (Machill & Beiler, 2009) and the "[news] source cycle, in which news content is continuously passed back and forth from media to media" (Messner & Distaso, 2008), p.448). However, the adoption of a single website as the authoritative journalistic source on EDs, perhaps reflecting its "Media Centre" section with clear figures and reporting guidelines, may have reduced this practice among UK journalists searching for ED prevalence information. A key message is that within a context of confusing statistics, a clear and easily accessible "go to" website may increase the consistency of reporting elsewhere in the media. However, the range of statistics in the academic literature means even these "authoritative" figures remain uncertain.

This paper takes a novel approach, and has inevitable limitations. Our review of epidemiological and clinical research on ED rates was not intended to be exhaustive as we were aiming to contextualise the media portrayals rather than to undertake a systematic review. It relied on a single, although broad, database and did not include others which might have picked up additional medical and/or psychological

literature. It is therefore possible that important studies were missed. However, we did employ a transparent and reproducible strategy to our literature search, including identifying primary sources from the reference lists of key papers, together with additional studies not included in previous reviews of EDs in males. Previous reviews have tended to be broad in their coverage and so have included much less detail on prevalence or incidence rates. Another limitation is that when papers detailed in Table 1 did not include sufficient detail, prevalence figures were calculated on the assumption that samples included approximately equal numbers of males and females. Where this was not the case, our assumption may have resulted in inaccuracies in prevalence rates and, importantly, the figure "Males as % of overall". Further, our sample of web-based information represented a snapshot of material available at the time of writing, supplemented with three prominent and frequently cited reports from 2000 (Copperman, 2000), 2004 (National Institute for Clinical Excellence (NICE), 2004) and 2012 (Royal College of Psychiatrists' Section of Eating Disorders, 2012). Although we know the publication date of research studies, we do not know what web-based information journalists writing the newspaper articles over the sampled time-period (2002-12) had access to. Finally, our focus in respect of the newspaper articles was entirely on their reporting of prevalence and incidence statistics. We recognise that media descriptions and characterisations of men with EDs are likely to be equally or more important in determining how men recognise and respond to ED symptoms (MacLean et al., submitted), but such an analysis is outwith the scope of this paper.

This paper emerged from research on UK newspaper portrayals of EDs in males. Given the need to recognise and respond to ED symptoms at an early stage, we reasoned accurate public understandings of ED rates might serve to lessen stigma, particularly among male sufferers admitting to what is often erroneously described as a "female disorder" (Greenberg & Schoen, 2008), or increase clinicians' awareness of the possibility of ED diagnoses in males. Given the importance of mass media as sources of such health knowledge (Hilton et al., 2010; Lyons & Willott, 1999; Seale, 2002), what might male ED sufferers and those around them take from ED prevalence information on websites or in newspapers? While possibly unintended, different presentations of numbers may impact on understandings: "'1 percent' has an almost definitive smallness to it ... 'quarter of a million' (not 250,000) is 'millions talk' rather than 'thousands talk'" (Potter, Wetherell, & Chitty, 1991)p341). Further research would be required to determine whether lay readers understand media portrayals on prevalence of EDs in men as meaning they are (surprisingly) common or rare.

In respect of gender differences, current evidence suggests women are more likely to suffer an ED, so in that respect they *are* more often "female" disorders. Importantly, however, the tone adopted in media discussion of EDs is likely to impact on readers' understandings of exactly *how* "female" they are. While most websites suggested around 10% of ED sufferers were men, contrasting with academic research suggesting up to 25% in community-based samples, newspaper estimates of the proportion of men increased over the period studied, settling at 20% and frequently referring to earlier figures relating to men as "too low" (again, perhaps reflecting reliance on the b-eat "Media Centre"). Both websites and newspaper articles highlighted lack of attention and under-diagnosis of EDs in men and, despite no consistent research evidence, some websites and many newspaper articles suggested male ED rates were increasing. While "reputable" health-related organisations or charities will aim to present balanced, factual information on their websites, news values revolve around capturing audience attention (Price, Tewksbury, & Powers, 1997). Paradoxically, cultural stereotypes of EDs as "*female*" may therefore mean *males* with EDs are far more newsworthy, and resulting recent newspaper presentations of EDs among men as increasingly common (even if not scientifically evidenced) and "hidden" may have served to increase awareness and lessen stigma felt by males with EDs. However, media sensationalism, also used to capture audience attention (Bennett, 2005), and noted in previous analyses of ED presentations in newspapers (Mondini et al., 1996; O'Hara & Smith, 2007; Shepherd & Seale, 2010) may mean men with EDs are portrayed in ways which tip the balance back towards their stigmatisation (MacLean et al., submitted). Although speculative, this suggests future studies should analyse both media portrayals of men with EDs and audience reception of such portrayals.

More broadly, our findings have a number of implications. First is the need for more evidence on rates of EDs among males in community samples, based on even larger studies. Second is the need for researchers and clinicians to collaborate with the producers of health information in the media to maximise public understandings on the basis of current uncertain evidence. Thirdly, our results suggest that focusing on the most highly visible health and charity websites may be the most efficient way to do this,

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FOOTNOTES

[a] A google search of 'eating disorders' (26th May 2014) identified, in order: (1) Eating disorders - NHS Choices*; (2)* b-eat - Home; (3) News for eating disorders (Teen's recovering from eating disorders inspires thousands ... *Daily Mail* - 1 day ago; juice fasts 'masking eating disorders' *The Australian* - 9 hours ago; Orthorexia takes healthy eating to the extreme *CBC.ca* - 3 days ago); (4) Eating disorder – Wikipedia*; (5)* National Centre for Eating Disorders*; (6)* Eating Disorders - Mental Health Foundation*; (7)* Anorexia and Bulimia - Royal College of Psychiatrists; (8) Mind - Eating problems; *(9)* Eating disorders - About NICE guidance*; (10)* Men Get Eating Disorders Too.

[b] www.mhfs.org.uk/resources/nmhw2005/male_treatment.rtf

[c] http://www.nice.org.uk/nicemedia/pdf/cg9fullguideline.pdf

[d] www.rcpsych.ac.uk/files/pdfversion/CR170.pdf

[e] http://www.rcpsych.ac.uk/expertadvice/problemsdisorders/eatingdisorderskeyfacts.aspx

[f] http://www.rcpsych.ac.uk/healthadvice/problemsdisorders/anorexiaandbulimia.aspx

[g] http://www.mentalhealth.org.uk/help-information/mental-health-a-z/E/eating-disorders/

[h] http://www.nhs.uk/conditions/eating-disorders/pages/introduction.aspx

[i] http://eating-disorders.org.uk/

[j] http://www.disordered-eating.co.uk/index.html

[k] http://www.b-eat.co.uk/get-help/about-eating-disorders/information-sheets/

[l] http://www.b-eat.co.uk/about-beat/media-centre/

[m] http://mengetedstoo.co.uk/

[n] http://en.wikipedia.org/wiki/Eating_disorder

[o] The estimated UK population for 2007 (the middle of the 2002-2012 newspaper sample) was 61 million (Office for National Statistics, 2010)

Table 1: Epidemiological studies of eating disorders which include and/or compare rates for males and females – community samples

Author	Date	Country	Sample age	Sample description	Data collection procedures	Measure	Overall (%)	M (%)	F (%)	M as % of overall
Section 1: EDs – overall										
1a – Lifetime prevalence										
Woodside	2001	Canada	15+	Community epidemiologic survey	Structured interview generating DSM-III-R diagnoses	Weighted lifetime prevalence rate of full/partial EDs (DSM-III-R)	* 3.4	2.0	4.8	29.4
Kjelsas	2004	Norway	14-15	Adolescents completing a school-based survey	Self-completion questionnaire including items designed to generate DSM-III-R and DSM-IV ED diagnoses	Lifetime prevalence of any ED (DSM-IV)	* 12.2	6.5	17.9	26.6
1b – current/ past year prevalence										
Garner	1997	USA	? Adults	Responses to a questionnaire in 'Psychology Today' publication	Self-completion questionnaire	Reported they thought they had an ED but had not been treated	* 9.5	5	14	26.3
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Point prevalence of any ED (DSM-IV)	* 5.3	2.5	8.0	23.8
Hay	2005	Australia	17+	Individuals chosen randomly from general practices	Eating disorder screening questionnaire (EDE-Q) followed by interview	Questionnaire-based DSM-IV criteria for a current ED	* 3.2	1.2	5.2	18.8
UK National Centre for Social Research (published as Thompson et al, 2009)	2007	UK	Adults	Large general population sample	Self-completion questionnaire including ED screening tool (SCOFF)	Screening positive for possible ED in the past year	6.4	3.5	9.2	26.4

* Original paper does not include figures for prevalence overall, in males *and* in females, so some calculation (by HS) necessary, and assumes approximately equal numbers of males and females. As an example, Woodside et al (2001) note their sample "was weighted to adjust for nonresponse and to reconcile its age-gender profile with that of the 1991 Ontario census" and in their results that "The prevalence rate (weighted) of full or partial eating disorders for men was 2.0% compared with 4.8% for women". No (base) numbers are provided. Assuming equal sized samples of, for example, 1,000, these percentages translate into 20 men and 48 women. This is a total of 68 with EDs out of 2,000, which is 3.4% of the overall sample with an ED. It is 20 men out of 68, which means 29.4% of those with EDs were men.

Table 1: Epidemiological studies of eating disorders which include and/or compare rates for males and females – community samples - continued

Author	Date	Country	Sample age	Sample description	Data collection procedures	Measure	Overall (%)	M (%)	F (%)	M as % of overall
Section 2: Anorexia										
2a – Lifetime prevalence										
Rastam	1989	Sweden	15	All 15-year olds in Goteborg	Brief screening questionnaire and examination of growth charts followed by interviews with school nurses and then psychiatric interview	Lifetime prevalence of AN full syndrome (DSM-III / DSM-III-R)	0.40	0.09	0.70	11.8
						Lifetime prevalence of AN partial syndrome	0.07	0.00	0.14	0.0
						Lifetime prevalence of AN full or partial syndrome	0.47	0.09	0.84	10.0
Woodside	2001	Canada	15+	Community epidemiologic survey	See 1a	Lifetime prevalence AN full syndrome (met all DSM-III-R criteria)	* 0.41	0.16	0.66	19.5
						Lifetime prevalence AN partial syndrome (met most DSM-III-R criteria)	* 0.96	0.76	1.15	39.8
						Lifetime prevalence AN full or partial syndrome	* 1.37	0.92	1.81	33.7
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Lifetime prevalence of AN (DSM-IV)	* 0.45	0.2	0.7	22.2
Hudson	2007	USA	18+	Nationally representative household survey	Structured interview generating DSM-IV diagnoses	Lifetime prevalence estimates of AN (DSM-IV)	0.6	0.3	0.9	25.0
2b – current/ past year prevalence										
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Point prevalence of AN (DSM-IV)	* 0.40	0.2	0.6	25.0
Hudson	2007	USA	18+	See 2a	See 2a	12-month prevalence estimates of AN (DSM-IV)	0.0	0.0	0.0	n/a

* Original paper does not include figures for prevalence overall, in males *and* in females, so some calculation (by HS) necessary, and assumes approximately equal numbers of males and females.

Table 1: Epidemiological studies of eating disorders which include and/or compare rates for males and females – community samples - continued

Author	Date	Country	Sample age	Sample description	Data collection procedures	Measure	Overall (%)	M (%)	F (%)	M as % of overall
Section 3: Bulimia										
3a – Lifetime prevalence										
Rastam	1989	Sweden	15	All 15-year olds in Goteborg	See 2a	Lifetime prevalence of BN full or partial syndrome (DSM-III)	* 0.07	0.00	0.14	0.0
Bushnell	1990	New Zealand	18-64	General population survey	Structured interview generating DSM-III diagnoses	Lifetime prevalence of DSM-III defined BN	1.0	0.2	1.9	9.5
Garfinkel	1995	Canada	15-64	Non-clinical community sample	Structured interview generating DSM-III-R diagnoses	Lifetime prevalence of full syndrome BN (DSM-III)	* 0.6	0.1	1.1	8.3
						Lifetime prevalence of full or partial syndrome (lacking only one criterion) BN (DSM-III)	1.5	0.6	2.4	20.0
Woodside	2001	Canada	15+	See 1a	See 1a	Lifetime prevalence BN full syndrome (met all DSM-III-R criteria)	* 0.80	0.13	1.46	8.2
						Lifetime prevalence BN partial syndrome (met most DSM-III-R criteria)	* 1.33	0.95	1.70	35.8
						Lifetime prevalence BN full or partial syndrome	* 2.12	1.08	3.16	25.5
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Lifetime prevalence of BN (DSM-IV)	* 0.8	0.4	1.2	25.0
Hudson	2007	USA	18+	See 2a	See 2a	Lifetime prevalence estimates of BN (DSM-IV)	1.0	0.5	1.5	25.0
3b – current/ past year prevalence										
Westenhoefer	2001	Germany	18+	Representative sample of adults	Self-completion questionnaire	Current BN (purging/non-purging)	* 1.1	1.1	1.1	50.0

* Original paper does not include figures for prevalence overall, in males *and* in females, so some calculation (by HS) necessary, and assumes approximately equal numbers of males and females.

Table 1: Epidemiological studies of eating disorders which include and/or compare rates for males and females – community samples - continued

Author	Date	Country	Sample age	Sample description	Data collection procedures	Measure	Overall (%)	M (%)	F (%)	M as % of overall
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Point prevalence of BN (DSM-IV)	* 0.4	0.3	0.5	37.5
Hudson	2007	USA	18+	See 2a	See 2a	12-month prevalence estimates of BN (DSM-IV)	0.3	0.1	0.5	16.7
Section 4: BED										
4a – Lifetime prevalence										
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Lifetime prevalence of BED (DSM-IV)	* 1.2	0.9	1.5	37.5
Hudson	2007	USA	18+	See 2a	See 2a	Lifetime prevalence estimates of BED (DSM-IV)	2.8	2.0	3.5	36.4
4b – current/ past year prevalence										
Westenhoefer	2001	Germany	18+	See 3b	See 3b	Current BED (recurrent binges without compensating behaviour)	* 1.1	1.5	0.7	68.2
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Point prevalence of BED (DSM-IV)	* 0.4	0.4	0.4	50.0
Hudson	2007	USA	18+	See 2a	See 2a	12-month prevalence estimates of BED (DSM-IV)	1.2	0.8	1.6	33.3
Section 5: EDNOS										
5a – Lifetime prevalence										
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Lifetime prevalence of EDNOS (DSM-IV)	* 9.8	5.0	14.6	25.5

* Original paper does not include figures for prevalence overall, in males *and* in females, so some calculation (by HS) necessary, and assumes approximately equal numbers of males and females.

Table 1: Epidemiological studies of eating disorders which include and/or compare rates for males and females – community samples - continued

Author	Date	Country	Sample age	Sample description	Data collection procedures	Measure	Overall (%)	M (%)	F (%)	M as % of overall
5b – current/ past year prevalence										
Kjelsas	2004	Norway	14-15	See 1a	See 1a	Point prevalence of EDNOS (DSM-IV)	* 4.1	1.7	6.5	20.7
Section 6: ED symptoms										
6a – Lifetime prevalence										
Garfinkel	1995	Canada	15-64	See 3a	See 3a	Binge-eating more than once ever	* 8.0	7.8	8.2	48.8
						Binge eating more than twice per week ever	* 3.3	3.3	3.2	50.8
Hudson	2007	USA	18+	See 2a	See 2a	Lifetime prevalence estimate of sub-threshold BED (DSM-IV)	1.2	1.9	0.6	76.0
						Lifetime prevalence estimate of any binge eating (DSM-IV)	4.5	4.0	2.5	40.5
6b – current/ past year prevalence										
Garner	1997	USA	? Adults	See 1b	See 1b	Vomiting to control weight weekly or more within past year	* 3.5	1	6	14.3
						Abused laxatives within past year	* 4.5	3	6	33.3
						Took diuretics within past year	* 4.5	4	5	44.4
						Used diet pills within past year	* 9.0	6	12	33.3

* Original paper does not include figures for prevalence overall, in males *and* in females, so some calculation (by HS) necessary, and assumes approximately equal numbers of males and females.

Table 1: Epidemiological studies of eating disorders which include and/or compare rates for males and females – community samples - continued

Author	Date	Country	Sample age	Sample description	Data collection procedures	Measure	Overall (%)	M (%)	F (%)	M as % of overall
Westenhoefer	2001	Germany	18+	See 3b	See 3b	Current severe bingeing twice weekly	* 1.4	2.4	1.3	64.9
Hudson	2007	USA	18+	See 2a	See 2a	12-month prevalence estimate of sub-threshold BED (DSM-IV)	0.6	0.8	0.4	66.7
						12-month prevalence estimate of any binge-eating (DSM-IV)	2.1	1.7	2.5	40.5
Keel	2007	USA	40	Follow-up of college student cohort	Self-completion eating disorder questionnaire (EDI)	Current binge eating	* 6.0	4	8	33.3
						Current fasting	* 5.0	4	6	40.0
						Current vomiting to control weight	* 1.5	1	2	33.3
Striegel-Moore	2009	USA	18-35	Random sample of insurance scheme members surveyed	Self-completion eating disorder questionnaire (Patient health Questionnaire ED module)	Current loss of control over eating	* 24.8	20.0	29.6	40.3
						Current binge eat at least once per week	* 9.0	8.0	10.0	44.4
						Vomiting often in past 3 months to control weight gain	* 2.6	1.5	3.7	28.8

* Original paper does not include figures for prevalence overall, in males *and* in females, so some calculation (by HS) necessary, and assumes approximately equal numbers of males and females.

Table 2: Epidemiological studies of eating disorders which include and/or compare rates for males and females – diagnosed or clinic samples

Author	Date	Country	Sample age	Sample description	Numbers / proportions / rates	M	F	M as % of overall
Section 1: EDs – overall								
Braun	1999	USA	Adults	Patients presenting for their first admission with DSM-IV defined EDs at the New York Hospital, Cornell between 1984-1997	Proportions of total sample	7%	93%	7.0
Bramon-Bosch	2000	UK	Adults	Patients referred to the Maudsley Hospital ED unit over a 2.5 year period	Proportions of total sample	11%	89%	11.0
Striegel-Moore	2000	USA	? adults	Database covering in-and out-patient health care service use data for individuals covered by benefit plans of large employers, approx 2 million females and 2 million males	Proportions of those with any ED treatment claims	9%	91%	9.0
Button	2008	UK	Adults	Among 2,554 new patients assessed by a specialised service for adults between 1987-2007	Proportions of those with diagnosed EDs	5%	95%	5.0
Micali	2013	UK	10-49	General Practice Research Database (covers approx 3 million patients) screened for new cases of ED 2000-2009	2009 – ED incidence per 100,000, ages 20-29	10.1	88.5	8.3
					2009 – ED incidence per 100,000, ages 40-49	0.9	15.9	5.1
Section 2 Anorexia								
Jones	1980	USA	All ages	Incidence of diagnosed AN in Monroe County, NY between 1960-69 and 1970-1976	1960-1969 - rates per 100,000	0.20	0.49	27.3
					1970-1976 - rates per 100,000	0.09	1.16	6.5
Lucas	1991	USA	All ages	Medical records of all persons in community of Rochester, Minnesota from 1935-84 screened	AN incidence per 100,000 person-years, ages 20-24	4.6	27.6	11.6
					AN incidence per 100,000 person-years, ages 40-49	1.0	5.2	15.6

Table 2: Epidemiological studies of eating disorders which include and/or compare rates for males and females – diagnosed or clinic samples - continued

Author	Date	Country	Sample age	Sample description	Numbers / proportions / rates	M	F	M as % of overall
Striegel-Moore	2000	USA	? Adults	Database covering in-and out-patient health care service use data for individuals covered by benefit plans of large employers, approx 2 million females and 2 million males	Proportions of those with any treatment claims	9%	91%	9.0
Currin	2005	UK	All ages	General Practice Research Database (covers approx 3 million patients) screened for new cases of AN 1994-2000	2000 - AN incidence per 100,000	0.7	8.6	7.1
Van Son	2006	Netherlands	All ages	Primary care data – participating GPs had total average annual patient load of ~150,000 – examined incidence of AN during 1985-1989 and 1995-1999	1995-1999 - number of new AN cases identified 1995-1999	1	57	1.7
Button	2008	UK	Adults	Among 2,554 new patients assessed by a specialised service for adults between 1987-2007	Proportions of those with diagnosed AN	5%	95%	5.0
Micali	2013	UK	10-49	General Practice Research Database (covers approx 3 million patients) screened for new cases of ED 2000-2009	2009 – AN incidence per 100,000, ages 20-29	1.8	18.9	7.0
					2009 – AN incidence per 100,000, ages 40-49	0.3	1.1	20.0
Section 3								
Bulimia								
Striegel-Moore	2000	USA	? adults	Database covering in-and out-patient health care service use data for individuals covered by benefit plans of large employers, approx 2 million females and 2 million males	Proportions of those with any BN treatment claims	5%	95%	5.0
Currin	2005	UK	All ages	General Practice Research Database (covers approx 3 million patients) screened for new cases of BN 1994-2000	2000 - BN incidence per 100,000	0.7	12.4	5.1

Table 2: Epidemiological studies of eating disorders which include and/or compare rates for males and females – diagnosed or clinic samples - continued

Author	Date	Country	Sample age	Sample description	Numbers / proportions / rates	M	F	M as % of overall
Van Son	2006	Netherlands	All ages	Primary care data – participating GPs had total average annual patient load of ~150,000 – examined incidence of BN during 1985-1989 and 1995-1999	1995-1999 – number of new BN cases identified	1	45	2.2
Button	2008	UK	Adults	Among 2,554 new patients assessed by a specialised service for adults between 1987-2007	Proportions of those with diagnosed BN	4%	96%	4.0
Micali	2013	UK	10-49	General Practice Research Database (covers approx 3 million patients) screened for new cases of ED 2000-2009	2009 – BN incidence per 100,000, ages 20-29	4.7	31.8	10.5
					2009 – BN incidence per 100,000, ages 40-49	0.0	5.1	0.0
Section 4 EDNOS								
Striegel-Moore	2000	USA	? adults	Database covering in-and out-patient health care service use data for individuals covered by benefit plans of large employers, approx 2 million females and 2 million males	Proportions with any EDNOS treatment claims	19%	81%	19.0
Button	2008	UK	Adults	Among 2,554 new patients assessed by a specialised service for adults between 1987-2007	Proportions with diagnosed EDNOS	5%	95%	5.0
Micali	2013	UK	10-49	General Practice Research Database (covers approx 3 million patients) screened for new cases of ED 2000-2009	2009 – EDNOS incidence per 100,000, ages 20-29	3.2	37.8	6.3
					2009 – EDNOS incidence per 100,000, ages 40-49	0.6	9.6	5.6